UNION CARBIDE

INTERNAL CORRESPONDENCE

UNION CARBIDE NUCLEAR COMPANY • POST OFFICE BOX P, OAK RIDGE, TENNESSEE

To (Name) ORGDP Nuclear Safety Committee:
Company
Location

K. W. Bahler	A. J. Mallett - RC
R. M. Batch	J. A. Marshall
A. D. Callihan	C. E. Newlon
G. A. Garrett	R. L. Newton
A. P. Huber	J. A. Parsons
~~XXXXX~~ K. M. Jones	J. B. Scott
D. M. Lang	R. A. Walker
R. L. Macklin	

Date August 8, 1962

Originating Dept.

Answering letter date

Subject Aluminum Melting Facility, K-1420

KD-1754 / Redacted

Redacted by:
W T Brown 3/31/00
C D Jackson 3/31/00

Copy to:
J. P. Murray
ORGDP (C. H. Mahoney)
Paducah (R. A. Winkel - R. C. Baker)
Y-12 (R. G. Jordan - J. D. McLendon)
GAT (G. H. Reynolds - F. E. Woltz)

Nuclear safety considerations were given to the installation of an aluminum melting facility in K-1420 for converting aluminum scrap to 50-lb. ingots of aluminum metal.[1] A flotation fusion process will be used to remove copper, iron, and nickel impurities, as well as nominal amounts of enriched uranium, to meet normal commercial tolerance limits. Approximately 1.5 million pounds of scrap are presently available for processing.

Equipment and Operation

Aluminum scrap will be melted and refined at approximately 1400° F. in three separate electrode salt-bath furnaces, operating in series as follows: a 720 lb. per hour capacity melting furnace 2 ft. x 5 ft. x 2.5 ft. deep; a tapping pot 1 ft. x 1.5 ft. x 3.5 ft. deep; and a 12,000 lb. aluminum capacity holding furnace 2 ft. x 14 ft. x 4.4 ft. deep.[2] Each furnace will be equipped with an automatic high temperature alarm and furnace cutoff set to actuate at 1700° F. Auxiliary equipment includes a charging hopper and gas-fired drying unit at the melting furnace, and an ingot casting machine, hydraulically operated, located adjacent to the holding furnace.

APPROVED FOR RELEASE
W.T. Brown / DOE 3/31/00

1 Letter to A. J. Mallett from J. Dykstra, Nuclear Safety Approval for Aluminum Melting Facility, June 11, 1962.
2 Upton Furnace Company, Inc., Dwg. M-1055; see also ORGDP Plant Engineering Project No. M-27634.

The metallic impurities will collect chiefly in a heavy sludge at the bottom of the melting furnace, or in a thin dross layer forming on the surface of the aluminum, with sludge formation predominating by a factor of greater than 100 to 1. The dross and sludge will be removed to 30-gallon drums and 55-gallon drums, respectively, spaced 2 ft. edge-to-edge. The salt-bath composition is a chloride mixture of 75% barium, 13% potassium and 12% sodium.

The various categories of scrap to be processed include [redacted] miscellaneous scrap including large aluminum transition pieces. Each type of scrap will be processed separately and although the miscellaneous scrap may be charged directly to the holding furnace, blade [redacted]

Nuclear Safety

The principal nuclear safety problem considered is that of gradual uranium accumulation in the dross and sludge formed by the continued processing of the various aluminum scrap materials; however, the absence of any significant quantities of hydrogenous moderating materials in the salt-baths is a decided factor of nuclear conservatism in this operation. Development work at the ORGDP[3] has shown that nominal quantities of enriched uranium may be present even though the aluminum scrap has been cleaned according to standard plant procedures, and that blade scrap, because of its casting method, will generally have the highest impurity content. Thus, the dross from the processing of blade scrap may contain up to a maximum of 6,500 ppm. U, while the sludge may range up to 3,000 ppm. U, by weight.*

Since frequent de-sludging and dross skimming operations are necessary for proper furnace operations, at least 2 to 3 times each shift, and since the sludge layer will normally not exceed a depth of 2 inches, it is considered unlikely that even the "safe" amount of 350 grams of U-235 could accumulate in the melting furnace and tapping pot combined, assuming the maximum ppm. values noted for sludge and dross materials. The possibility of dross or sludge carry-over to the holding furnace will be essentially eliminated since the tapping pot is tapped just below the surface to obtain high purity aluminum. However, the holding furnace will also be de-sludged, although at less frequent intervals than the melting furnace or tapping pot, generally after an aluminum casting run of 12,000 pounds. It may be noted that pre-operational tests, in which large transition pieces were charged directly to the holding furnace, have indicated that this sludge and dross contained only about 100 ppm. U, a negligible quantity.

* The data noted herein, which are based on a K-1401 salt-bath development furnace, were furnished by C. H. Mahoney of the ORGDP Technical Division.

3 Schussler, M., Holder, Jr., S. G., and Napoliton, D. S., Internal Consumption by Aluminum Castings, November 23, 1954 (K-1163).

The handling of the dross and sludge materials from any of the three furnaces will be limited to 275 pounds dross, in 30-gallon drums, and 600 pounds sludge in 55-gallon drums, each adequately spaced at 2 ft. edge separation[4] pending the results of routine analyses. Such weight limits will assure that each drum contains no more than 800 grams of U-235, even at a maximum U-235 enrichment of ~ 90% and the maximum ppm. U values noted herein for dross and sludge. In this case, the 800 grams of U-235 may be considered as a safe quantity in view of experimental data[5] with highly enriched uranium-aluminum alloy slugs which indicate a minimum critical mass of about 3 kg. of U-235, for water reflection and optimum water moderation; the uranium content of the slugs, 5.0 ± 0.25 wt. %, is much higher than the maximum value of 0.65 wt. % found for the dross and sludge materials. An additional factor of conservatism is the U-235 enrichment assumed, since most of the high uranium content blade scrap was obtained from cascade locations of less than 10% U-235 enrichment although some was obtained at a 30% enrichment location.

However, should the subsequent laboratory analyses of the sludge and dross indicate the uranium content to be less than 1,000 ppm. U,* the materials may be considered as nuclearly non-reactive and may be disposed of, on-plant, without further spacing or U-235 mass considerations, provided permanent identification is made and adequate records maintained;[6] otherwise, handling will be as noted above.

Conclusion

The installation and operation of the new K-1420 aluminum melting facility appears safe as outlined herein.

C. E. Newlon
Nuclear Safety Department

CEN:AJM:hs

APPROVALS COMMITTEE ON NUCLEAR SAFETY

A. D. Callihan G. A. Garrett R. L. Macklin A. J. Mallett

* This concentration factor, which corresponds to an Al./U-235 ratio > 8,600, is considered "safe" for the uranium-aluminum systems of interest.

4 Henry, H. F., et al, Criticality Data and Nuclear Safety Guide Applicable to the Oak Ridge Gaseous Diffusion Plant, May 22, 1959 (K-1019, Fifth Revision).

5 Fox, J. K., and Gilley, L. W., Critical Mass Studies: Part XI. Critical Parameters of Uranium-Aluminum Alloy Slugs, May 28, 1962 (ORNL-3272).

6 Mallett, A. J., Sediment Removal, K-1407-B, September 21, 1961 (KR-167).

(14)

UNITED STATES
ATOMIC ENERGY COMMISSION

In Reply Refer To:
O:WK

Portsmouth, Ohio

OCT 21 1959

Goodyear Atomic Corporation
Post Office Box 628
Portsmouth, Ohio

Attention: Mr. D. H. Francis, General Manager

Subject: ALUMINUM SCRAP DISPOSAL

Gentlemen:

We are enclosing, for your information, a copy of a memorandum dated October 15, 1959, from S. R. Sapirie to G. F. Quinn, subject as above.

You will note that Mr. Sapirie's recommendations relative to aluminum scrap consist principally of the following:

1. That contaminated aluminum scrap be decontaminated and smelted at government-owned plants by the operating contractors.

2. That certain specifications be adopted as acceptable for sale of recovered aluminum ingots on the open market when the aluminum is surplus to that which can be reused to meet new Commission requirements.

Very truly yours,

R. H. McCulloh

R. H. McCulloh
Manager, Portsmouth Area

Enclosure:
Memo dtd. 10-15-59 fr. Sapirie to Quinn

cc w/encl: WAO
CRM
CLJ
DWD
HR 10/21

EH-10 TEAM

BOARD FORM NO. 64

~~CONFIDENTIAL~~

Office Memorandum • UNITED STATES GOVERNMENT

TO : G. F. Quinn, Director, Division of Production, Washington

DATE: October 15, 1959

FROM : S. R. Sapirie, Manager
Oak Ridge Operations

SUBJECT: ALUMINUM SCRAP DISPOSAL

SYMBOL: OPO:HJM

As you are aware, a continuing and growing problem in the operation of the gaseous diffusion plants, is the generation of large quantities of uranium contaminated aluminum as a result of plant maintenance and the cascade improvement program. In addition to the contamination aspects, much of the material is highly classified and varies in size from small pieces to discs or cones 10 feet in diameter.

Considerable effort has been devoted on a laboratory and semi-pilot plant scale to developing direct smelting methods which would assure declassification of the material as well as produce an aluminum ingot which was relatively free from uranium contamination. These efforts have only been partially successful insofar as removing the uranium is concerned.

Because of the acute storage and security problem which the generation of this scrap was creating, a Paducah Plant Committee has made a comprehensive study of the overall problem. The findings and recommendations of the Committee are contained in the enclosed Confidential Report KY-293, "Scrap Aluminum Disposal". While the report relates specifically to the problems at Paducah the findings and recommendations are, in general, also applicable to the ORGDP and Portsmouth plants.

It appears that a combination of pre-treatment by immersion of the aluminum in 60% nitric acid, followed by smelting, will effectively destroy the identity of the classified material, as well as produce a metallurgically acceptable ingot. The estimated capital cost of a nitric acid decontamination facility and a 14,000 pound capacity Aluminum Reverberatory Furnace at Paducah is $45,000. The unit cost of converting the scrap aluminum into ingot form is estimated to be $0.05 per pound.

Document(s) Transmitted Herewith
Contain(s) RESTRICTED DATA

~~CONFIDENTIAL~~

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Enclosure Handle This Document
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We are of the opinion that any ultimate solution to the overall aluminum problem will require that the scrap be in ingot form. The storage and handling problems as well as space utilization and the potential hazard of large aluminum pieces in high winds appear to be sufficient justification for the volume reduction of the scrap in any event.

The results of the study indicate that with a reasonable degree of control the bulk of the salvaged aluminum at Paducah, which will total almost four million pounds by the end of FY-1961, can be processed and sold for a net gain of approximately $500,000. It is considered that this can be accomplished by converting the various types of scrap into ingots which could be:

1. Provided to suppliers as a government furnished item for reworking into products for use within the plants and,

2. Made available as metallurgically certified ingots for sale on the open market.

The House Appropriation Committee has directed that procedures be implemented as rapidly as possible for drawing aluminum requirements of the AEC for 1960 from the Defense Production Act Inventory. Since our stockpile of aluminum scrap is, in effect, an inventory of usable material, we believe it would be in keeping with the intent of this directive to agressively explore possible uses within the AEC for this material. Weapons cases, fuel elements, reactor parts, etc. appear to be sources of possible use.

No standards have been established for the sale of aluminum scrap containing uranium. Manual Chapter AEC 5170, however, provides standards which may be used for the release or sale of radioactively contaminated equipment, which equipment could, of course, include aluminum or aluminum alloy components. Accordingly, it would seem that aluminum ingots meeting the following specifications should be acceptable for sale on the open market since the quantity of source or special nuclear material contained per 30 pound ingot would be many factors less than quantities considered de minimus, and the specified radiation levels much lower than those considered of any significance from a health and safety standpoint:

(1) Uranium content - less than 75 ppm

(2) Average alpha surface activity - less than 10 disintegrations/minute/cm^2.

(3) Beta - gamma surface activity - less than 0.1 millirad/hour (above normal background) as measured with a thin window unshielded probe in contact with the material.

It will be noted that we are recommending a somewhat higher value for uranium content and beta-gamma activity than is contained in the Paducah report. This is to provide for a degree of latitude considered necessary since we may reasonably expect some variation in the nature of the scrap at the various plants plus the fact that our present information is based on semi-production runs. The values recommended are considered conservative by present standards and we expect that the majority of ingots produced would be substantially lower than the specifications recommended.

From a metallurgical viewpoint, aluminum alloys can contain up to 0.05% (500 ppm) uranium as an impurity as long as the total amount of the uranium plus other unspecified elements, does not exceed 0.15%. Since the photographic and radiation detection industries specify virgin primary aluminum for their equipment needs, we can think of no potential consumer who would suffer a product affection from the impurities contained in ingots meeting the above specifications.

There are a number of factors which combine to preclude the disposal of the aluminum scrap through privately owned facilities. These are the security aspect, the contamination problem, and the quantity of scrap available at each plant. Past experience has proved the difficulty of shipping or removing this material from the plant confines without incurring serious security problems related to barrier technology. The contamination aspect will require controls and techniques of a nature not followed by the aluminum smelting industry, plus discard of the dross in order to assure an acceptable ingot. Thirdly, the quantities of aluminum scrap available at each site, while appreciable, are not believed sufficiently great to induce an aluminum processor to set up a facility in the immediate plant areas.

In view of the above, we conclude that the most economical and feasible method of accomplishing this necessary salvage would be to construct the necessary facilities at the respective gaseous diffusion sites. We would propose to finance the installations at each site using FY-1960 GPP funds; however, construction of the facilities appears to be contingent upon the granting of an exception to the General Manager's memorandum of June 24, 1955, symbol: CS:GCT, and the Bureau of the Budget Bulletin 57-7, subject, "Commercial-Industrial Activities of the Government Providing Products or Services for Governmental Use." We believe that it would be in the public interest to request an exception to the policy outlined in BOB Bulletin 57-7 to permit construction of these facilities at the Government-owned plants and the operation of the facilities by our operating contractors.

~~CONFIDENTIAL~~

Your assistance in obtaining an exception to the provisions of BOB Bulletin 57-7, with respect to these facilities, will be appreciated. In addition, contingent on the granting of such an exception, we request your concurrence in releasing to the open market metallurgically certified aluminum ingots which meet the specifications previously set forth, and that are in excess of those needed for products for our own use.

S. R. Sapirie

Enclosure:
KY-293

CC: R. C. Armstrong, w/o Encl.
R. J. Brown, w/o Encl.
H. M. Roth, w/o Encl.
R. H. Miller, w/o Encl.
J. W. Gould, Jr., w/o Encl.
Leo Dubinski, w/o Encl.
N. A. Shearon, w/o Encl.
K. C. Brooks, AEC, Paducah, w/o Encl.
R. H. McCulloh, AEC, Portsmouth, w/o Encl.

~~CONFIDENTIAL~~

43588

4/5 ofg to ans
KBB

UNITED STATES
ATOMIC ENERGY COMMISSION

IN REPLY REFER TO:
AF:GWS

Piketon, Ohio 45661

MAR 29 1966

Goodyear Atomic Corporation
Piketon, Ohio 45661

Attention: Mr. G. H. Reynolds, General Manager

Subject: GOVERNMENT USE PROGRAM FOR ALUMINUM

Gentlemen:

Attached for your review and comment is proposed AECPI 9-5.5001, "Use of Excess Materials from Defense Materials Inventories", with a memorandum from Headquarters, dated March 21, 1966, and the attachments mentioned in the memorandum.

We will appreciate receiving your comments by April 5, 1966.

Very truly yours,

R. V. Anderson

R. V. Anderson
Manager, Portsmouth Area

Enclosures:
As stated above (in dup.)

3/29/66

bcc: C. L. Jenkins Copy

Refer to: AF:GWS

U. S. Atomic Energy Commission
Piketon, Ohio 45661

Attention: Mr. R. V. Anderson
Manager, Portsmouth Area

Subject: GOVERNMENT USE PROGRAM FOR ALUMINUM

Gentlemen:

This is in reply to your letter dated March 29, 1966, regarding the above subject.

We believe the adoption of such a program is feasible if, as suggested, exceptions for de minimis quantities are included such as the $500 or more value and approximately 10,000 pounds or more of aluminum per order or subcontract.

We assume pigs or ingots produced here on the site or at another AEC installation and used to produce items by suppliers would relieve us of the necessity of purchasing from GSA on a pound for pound basis.

Yours very truly,

ORIGINAL SIGNED BY
G. H. REYNOLDS

G. H. Reynolds
General Manager

HW:mee

ALUMINUM SURVEY

	Period Ending	
	6/30/65	12/31/65
Total Ingots Produced	-0-	-0-
Receipts:		
Wrought	2,500	3,000
Misc. Cast	5,000	6,170
Blades	25,600	18,800
Total	33,100	27,970
Balance on Hand:		
Wrought	2,500	5,500
Misc. Cast	64,800	70,970
Blades	69,600	88,400
Total	136,900	164,870
Total Ingots Sold	-0-	-0-

1/13/66

GOODYEAR

Goodyear Atomic Corporation

P.O. Box 628
Piketon, Ohio 45661

A SUBSIDIARY OF THE GOODYEAR TIRE & RUBBER COMPANY
ACTING UNDER U. S. ATOMIC ENERGY COMMISSION CONTRACT AT-(33-2)-1

TELEPHONE: PIKETON, OHIO AREA CODE 614-289-5511 TWX: 614-340-0800 TELEGRAMS: WUX-PIKETON, OHIO

(5)

JAN 13 1966

GAT-801-66-3

U. S. Atomic Energy Commission
Piketon, Ohio 45661

Attention: Mr. R. V. Anderson
Manager, Portsmouth Area

Subject: SCRAP ALUMINUM SURVEY

Gentlemen:

Attached is a tabulation covering aluminum on hand for the period ending 6/30/65 and 12/31/65. These figures will update our letter (GAT-801-65-9) dated February 5, 1965, and will confirm the verbal request from Mr. George Smith to R. M. Rutherford of 1/10/66.

We hope these figures will meet your needs and if you have other questions regarding this subject, please contact me.

Very truly yours,

ORIGINAL SIGNED BY
G. H. REYNOLDS
G. H. Reynolds
General Manager

RMR
RMR:pab

Enc.

bcc: J. E. Hale
H. E. Kelley

UNITED STATES
ATOMIC ENERGY COMMISSION

IN REPLY REFER TO:
AF:GWS

Portsmouth, Ohio
DEC 20 1960

Goodyear Atomic Corporation
Portsmouth, Ohio

Attention: Mr. G. H. Reynolds, General Manager

Subject: URANIUM LIMIT FOR ALUMINUM INGOTS SOLD TO THE PUBLIC OR FURNISHED TO FABRICATORS

Gentlemen:

On March 14, 1960, we furnished you with a copy of a teletype from Oak Ridge worded as follows:

"Unclas re telecon Thalgott and McAlduff March 11 disposal of scrap aluminum. Washington approval for aluminum smelter at Paducah included criteria for sale of aluminum ingots on open market. Following specifications to be used for the sale of ingots or unclassified aluminum scrap:

"1. Uranium content - less than 75 ppm.

"2. Average alpha surface activity less than 1000 D/MIN/100 CM^2.

"3. Beta-gamma surface activity less than 0.1 millirad/hr. above normal background as measured with a thin window unshielded probe in contact with the material.

"In view of the above criteria it is considered that ingots would be sold as certified metallurgical ingots that is analyses would be provided which would show the uranium content of the ingot. The sale of scrap under these criteria would require the standard contamination clauses used in the sale of ferrous scrap with the exception that no monitoring report would be required."

12/20/60

We are now informed that the uranium concentration limit for recovered aluminum ingots to be offered for sale or furnished to fabricators has been increased from 75 ppm to 300 ppm.

Wherever it is economically advantageous to the Government, the recovered ingots should be furnished to fabricators for reworking into components to be used on plant site. This should be done in any instance where the cost will be the same as if the fabricator were to buy on the market, or cost of fabricating can be reduced for furnishing the recovered aluminum. Inasmuch as these procedures are not intended to circumvent property disposal regulations, purchase orders issued to fabricators should provide that excess aluminum not used in fabricating the items covered by the order shall remain the property of the Government, and shall be returned or disposed of as directed by Goodyear.

Very truly yours,

Robert H. Thalgott

Robert H. Thalgott
Manager, Portsmouth Area

cc C&J
KMK
WLL 12/20

UNITED STATES
ATOMIC ENERGY COMMISSION

5/31/61

IN REPLY REFER TO:
AF:GWS

Portsmouth, Ohio

MAY 2 1961

Goodyear Atomic Corporation
Portsmouth, Ohio

Attention: Mr. G. H. Reynolds, General Manager

Subject: SALE OF ALUMINUM INGOTS FROM SMELTING OPERATIONS

Gentlemen:

Attached is a copy of a self-explanatory memorandum from Oak Ridge dated May 23, 1961, subject as above.

The contents of this memorandum confirm the information given to Mr. Zigler verbally on May 25, by George W. Smith.

Very truly yours,

for Robert H. Thalgott
Manager, Portsmouth Area

Enclosure:
Memo, 5/23/61, frm CAK

cc w/enc. CFJ

APPROVED FOR RELEASE
W.T. Brown /DOE 3/31/00

UNCLASSIFIED/NOT UCNI
Charles Crabtree ADC 4148
Review Date: 4/3 /2000

COPY OF TELEGRAM RECEIVED 9:30 AM, MARCH 14, 1960

FM CHARLES A. KELLER, USAEC, OAK RIDGE, TENN.

TO R. H. McCULLOH, USAEC, PORTSMOUTH, OHIO

UNCLAS. RE. TELECON THALGOTT AND McALDUFF, MARCH 11 DISPOSAL OF SCRAP ALUMINUM. WASHINGTON APPROVAL FOR ALUMINUM SMELTER AT PADUCAH INCLUDED CRITERIA FOR SALE OF ALUMINUM INGOTS ON OPEN MARKET. FOLLOWING SPECIFICATIONS TO BE USED FOR THE SALE OF INGOTS OR UNCLASSIFIED ALUMINUM SCRAP:

1. URANIUM CONTENT - LESS THAN 75 PPM.
2. AVERAGE ALPHA SURFACE ACTIVITY LESS THAN 1000 D/MIN/100 CM-2.
3. BETA-GAMMA SURFACE ACTIVITY LESS THAN 0.1 MILLIRAD/HR. ABOVE NORMAL BACKGROUND AS MEASURED WITH A THIN WINDOW UNSHIELDED PROBE IN CONTACT WITH THE MATERIAL.

IN VIEW OF THE ABOVE CRITERIA IT IS CONSIDERED THAT INGOTS WOULD BE SOLD AS CERTIFIED METALLURGICAL INGOTS THAT IS ANALYSES WOULD BE PROVIDED WHICH WOULD SHOW THE URANIUM CONTENT OF THE INGOT. THE SALE OF SCRAP UNDER THESE CRITERIA WOULD REQUIRE THE STANDARD CONTAMINATION CLAUSES USED IN THE SALE OF FERROUS SCRAP WITH THE EXCEPTION THAT NO MONITORING REPORT WOULD BE REQUIRED.

REF OPORJM160

C O P Y

Distribution:
C. L. Jenkins
D. W. Doner
W. A. Brown
C. R. Milone
G. H. Reynolds

PIKE 386 V DY 60 NR 29A COLLECT

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ZNR

P 1118002

FM CHARLES A KELLER USAEC OAKRIDGE TENN

TO R H MCCULLOH USAEC PORTSMOUTH OHIO

AEC GRNC

BT

UNCLAS. RE. TELECON THALGOTT AND MCALDUFF MARCH 11

DISPOSAL OF SCRAP ALUMINUM. WASHINGTON APPROVAL FOR ALUMINUM SMELTER AT PADUCAH INCLUDED CRITERIA FOR SALE OF ALUMINUM INGOTS ON OPEN MARKET. FOLLOWING SPECIFICATIONS TO BE USED FOR THE SALE OF INGOTS OR UNCLASSIFIED ALUMINUM SCRAP.

1. URANIUM CONTENT - LESS THAN 75 PPM.
2. AVERAGE ALPHA SURFACE ACTIVITY LESS THAN 1000 D/MIN/100 CM-2.
3. BETA-GAMMA SURFACE ACTIVITY LESS THAN 0.1 MILLIRAD/HR. ABOVE NORMAL BACKGROUND AS MEASURED WITH A THIN WINDOW UNSHIELDED PROBE IN CONTACT WITH THE MATERIAL.

cc. CLJ
DWD
WAS
CRM
GHR
3/14/60

PAGE TWO RUEAOE 69

IN VIEW OF THE ABOVE CRITERIA IT IS CONSIDERED THAT INGOTS WOULD BE SOLD AS CERTIFIED METALLURGICAL INGOTS THAT IS ANALYSES WOULD BE PROVIDED WHICH WOULD SHOW THE URANIUM CONTENT OF THE INGOT. THE SALE OF SCRAP UNDER THESE CRITERIA WOULD REQUIRE THE STANDARD CONTAMINATION CLAUSES USED IN THE SALE OF FERROUS SCRAP WITH THE EXCEPTION THAT NO MONITORING REPORT WOULD BE REQUIRED

REF OPOHJM160

BT

11/1900Z

END SENT 2

REC 2 MSG BJ END

O

UNITED STATES
ATOMIC ENERGY COMMISSION

IN REPLY REFER TO:
AF:JRW

Piketon, Ohio

MAR 24 1964

Goodyear Atomic Corporation
Piketon, Ohio

Attention: Mr. G. H. Reynolds, General Manager

Subject: USE OF ALUMINUM INGOTS FROM SMELTING OPERATIONS FOR REWORK INTO CASCADE COMPONENTS

Gentlemen:

Reference is made to the following:

1. Letter dated December 20, 1960, from R. H. Thalgott to you, subject "Uranium Limit for Aluminum Ingots Sold to the Public or Furnished to Fabricators".

2. Memorandum dated May 23, 1961, from C. A. Keller to R. H. Thalgott, subject "Sale of Aluminum Ingots from Smelting Operations" (copy sent to you with our letter dated May 29, 1961, same subject).

3. Memorandum dated July 15, 1959, from E. J. Bloch to S. R. Sapirie, subject "Reworking of Slightly Contaminated Equipment by Commercial Concerns". (Copy enclosed).

4. Letter dated September 3, 1959, from S. R. Sapirie to C. E. Center, subject "Licensing Requirements with Regard to Property (all Types and Classes) Contaminated with Source or Special Nuclear Materials". (Copy enclosed).

References 1 and 2 above furnish uranium specifications applicable to aluminum ingots that are to be sold to the public and urge that effort should be exerted to dispose

3/26/64

MAR 24 1964

of aluminum ingots wherever possible by reworking into components for cascade use, if it is economically advantageous to the Government. We have since been advised that the uranium limits specified in references 1 and 2 above need not be considered limiting in cases where aluminum ingots are to be reworked into cascade components.

As you are probably aware, the Paducah plant has purchased compressor blades in several instances that were fabricated from aluminum ingots furnished by Paducah containing greater than 300 ppm uranium. Inasmuch as the blade smelting operations at Portsmouth have not always resulted in ingots containing less than 300 ppm uranium, we wish to urge that the possible advantages of supplying such ingots for use in fabricating cascade components be thoroughly investigated in the future. The surface contamination and uranium content of the individual ingots should comply with the specifications set forth in references 3 and 4 above; however, the uranium content in the fabricated blade will probably be limited principally by metallurgical properties that it produces. The arrangements for having recovered aluminum reworked into cascade components will, of course, have to provide for the return of the dross and slag from the casting operation as well as the desired end product.

If my staff and I can be of further assistance in arranging for the reworking of recovered aluminum, please advise.

Very truly yours,

R. V. Anderson

R. V. Anderson
Manager, Portsmouth Area

Enclosures:
1. Memo, 7/15/59 (in dup)
2. Ltr., 9/3/59 (in dup)

cc w/encs. C & J.
KMK
WLS.
OWD.

C O P Y

Oak Ridge, Tennessee
September 3, 1959

PO:HJM

Union Carbide Nuclear Company
Post Office Box P
Oak Ridge, Tennessee

Attention: Mr. C. E. Center, Vice President

Subject: LICENSING REQUIREMENTS WITH REGARD TO PROPERTY (ALL TYPES AND CLASSES) CONTAMINATED WITH SOURCE OR SPECIAL NUCLEAR MATERIALS

Gentlemen:

Reference is made to prior correspondence concerning the above subject as follows:

C. E. Center to S. R. Sapirie, July 3, 1958
C. E. Center to S. R. Sapirie, July 17, 1958
S. R. Sapirie to C. E. Center, August 14, 1958
S. R. Sapirie to C. E. Center, September 23, 1958
L. B. Emlet to S. R. Sapirie, November 20, 1958

We have been advised that the quantity of source or special nuclear material involved in any transfer of uranium contaminated equipment or other property made in accordance with the procedures set forth below, would be de minimis and without health or accountability significance. In those respects the contaminants would not be considered source or special nuclear material within the meaning of the Atomic Energy Act of 1954, as amended, and thus no licensing would be required:

(a) Prior to shipment, the level of radioactive contamination on the property shall be reduced to the lowest practicable level.

1. After cleaning, the equipment or property shall be monitored using appropriate instruments and techniques by qualified personnel. If monitoring indicates that the alpha contamination does not exceed 2000 disintegrations per minute per 100 cm^2, it shall be handled in the same manner as uncontaminated property.

2. If monitoring of the property, after thorough cleaning indicates that the values shown in 1, is exceeded due to activity fixed on the surface, but that the associated beta and/or gamma radiation is not greater than 1.0 millirad per hour in contact with the probe, and that the average alpha activity does not exceed 5,000 d/m/100 cm^2 with a peak alpha activity of 25,000 d/m/100 cm^2, it shall be handled in the same manner as uncontaminated property except that:

   (a) Notice shall be given to the recipient of the property that it has associated fixed surface radioactivity which is not a personnel hazard, together with any instructions considered appropriate by the plant radiation control group.

   (b) Care should be exercised in shipping by common carrier that applicable requirements of ICC regulations are observed.

3. No single piece of property may contain more than 200 microcuries of special nuclear material.

4. In the event of sale, the contamination clauses prescribed by OR-5180-042 c. shall be included in the sale terms and conditions.

It is believed that the above procedure represents a practical approach and provides the information requested relating to the reworking of contaminated cascade equipment.

Very truly yours,

Orig. Signed by

E. A. Wende
for S. R. Sapirie
Manager, Oak Ridge Operations

COPY

OFFICE MEMORANDUM

TO : S. R. Sapirie, Manager
Oak Ridge Operations Office

DATE: July 15, 1959

/s/ G. F. Quinn for
FROM: E. J. Bloch, Director
Division of Production

SUBJ: REWORKING OF SLIGHTLY CONTAMINATED EQUIPMENT BY COMMERCIAL CONCERNS

SYMBOL: PI:PH

Please refer to my memorandum of February 5, 1959, above subject.

The procedures proposed in your memoranda of August 21 and Sept. 23, 1958, symbols OPO:HJMc, have been reviewed by the Division of Licensing and Regulation and the Office of the General Counsel. The Division of Licensing and Regulation has concluded that the quantity of special nuclear material involved in any transfer of contaminated equipment, made in accordance with the limitations set forth below, would be de minimis and without health or accountability significance. Based on this conclusion, the Office of the General Counsel is of the opinion that no licensing would be required.

The limitations are:

1. The transfer must meet the requirements of AEC 5182;

2. The alpha activity which is on the surface of the equipment and which is not readily removable may not exceed the limits specified in AEC 5182-05, as revised on August 30, 1956, i.e., the average alpha activity on the surface may not exceed 5,000 disintegrations per minute per 100 square centimeters of surface and the peak alpha activity on the surface may not exceed 25,000 disintegrations per minute measured over 100 square centimeters of surface; and

3. No single piece of equipment may contain more than 200 microcuries of special nuclear material.

Subject to the above limitations, I withdraw Item 2 of my February 5 memorandum.

GOODYEAR

Goodyear Atomic Corporation

P.O. Box 628

Portsmouth, Ohio

A SUBSIDIARY OF THE GOODYEAR TIRE & RUBBER COMPANY
ACTING UNDER U. S. ATOMIC ENERGY COMMISSION CONTRACT AT-(33-2)-1

PLANT SITE:
PIKE COUNTY, OHIO

TELEPHONE:
WAVERLY, OHIO

TELEGRAMS:
WUX-PORTSMOUTH, OHIO

September 24, 1962

GAT-801-62-26
Ref: AF:JRW
OPO:HDF

U. S. Atomic Energy Commission
Portsmouth, Ohio

Attention: Mr. R. V. Anderson
Manager, Portsmouth Area

Subject: ALUMINUM SMELTER OPERATIONS

Gentlemen:

The following information has been established as requested in your letter of September 13 regarding the evaluation of aluminum smelter operations:

1. Scrap cast aluminum blades on hand at the Portsmouth plant are estimated to total 120 tons.

2. Transportation costs for shipping aluminum blades from the Portsmouth plant to Oak Ridge is estimated at 4.37¢ per lb. GAT handling costs are estimated at 3.61¢ per lb. (includes G&A and overhead) plus freight costs of .76¢ per lb.

3. We have smelted wrought aluminum which yielded 570,973 lbs. of ingots at a cost of 10.66¢ per lb. The average market price received for these ingots in September, 1961, was 17.59¢ per lb. which grossed $100,440. The 10.66¢ per lb. included costly start-up and training charges. It has since been estimated that our operating costs should, in the near future, run approximately 7¢ per lb. without overhead and 12.7¢ per lb. including overhead. In addition to the

Subj: Aluminum Smelter Operations

3. Continued

blades, we have accumulated the following aluminum scrap:

(a)	Wrought aluminum	4 tons
(b)	Cast rotors	5 tons
(c)	Cast stators	50 tons
(d)	Castings, miscellaneous	31 tons
	Total	90 tons

Studies indicate that we could blend approximately 90 tons of cast blades with the above 90 tons of cast and miscellaneous aluminum which would total 180 tons of saleable ingots containing less than 300 ppm allowable uranium.

The present market price for these ingots is currently quoted at 16¢ per lb. This price, minus our smelting costs of 12.7¢ per lb., would leave a net gain of 3.3¢ per lb. or $11,880 for credit to GAT.

We have approximately one carload (volume wise) of contaminated non-classified scrap copper tubing which could be made available for shipment to Oak Ridge. The small lots of other metals accumulated at GAT are not significant enough to consider for shipment.

In the event you have other questions regarding this operation, please feel free to call us.

Yours very truly,

GOODYEAR ATOMIC CORPORATION

GHR:RMR:agb

G. H. Reynolds
General Manager

9/25

UNITED STATES
ATOMIC ENERGY COMMISSION

IN REPLY REFER TO:
AF:JRW

Portsmouth, Ohio

SEP 13 1962

Goodyear Atomic Corporation
Portsmouth, Ohio

Attention: Mr. G. H. Reynolds, General Manager

Subject: ALUMINUM SMELTER OPERATIONS

Gentlemen:

Attached is a self-explanatory memorandum from the Manager, Oak Ridge Operations, explaining the capabilities of the ORGDP Smelter.

Please provide us with the requested information.

Very truly yours,

for R. V. Anderson
Manager, Portsmouth Area

Enclosure:
ORO Memo 9/11/62 (2 cys)

cc w/Encl. CLJ
R.M.R *
JS.D

9/14/62

OPTIONAL FORM NO. 10
5010-104

UNITED STATES GOVERNMENT

Memorandum

TO : Those listed below

DATE: September 11, 1962

FROM : S. R. Sapirie, Manager, Oak Ridge Operations

SUBJECT: ALUMINUM SMELTER OPERATIONS

OPO:HDF

We are currently exploring the feasibility of processing contaminated compressor blades from all sites through the ORGDP Smelter as this is the only installation capable of reducing the uranium content of aluminum ingots from compressor blades below the maximum permissible level on a routine basis.

During the past several weeks the ORGDP Smelter has been in shakedown operations and is scheduled for startup in September 1962 and by January 1963 the facility will be available for the processing of contaminated compressor blades from other sites.

Presented below are typical analyses of heats made up of contaminated scrap compressor blades processed during the pilot plant operations.

Si	Fe	Cu	Mn	Mg	U	Other Elements Each	Other Elements Total
0.64	0.78	0.04	0.45	4.1	210 ppm	< 0.05	< 0.15

The scrap blades used for the above heats were taken at random from the storage yard and no metal was added from any other source. The magnesium content indicates that only a few 218 aluminum alloy blades were included; however, their random presence could result in a magnesium content that probably would not exceed 5%. The uranium content of the starting scrap ranged from 850 to 1450 ppm. Metal recovery exceeded 98%.

It is anticipated that the smelter facility will produce ingots reflecting a uranium content well below that obtained from pilot plant operations. The pilot plant utilized a single salt bath

Addressees:
Roy V. Anderson, Area Manager, Portsmouth
B. N. Stiller, Area Manager, Paducah

while three successive baths are employed in the production facility. This will assure maximum separation of high uranium dross from the metal prior to the casting step. Uranium contents of less than 200 ppm are anticipated.

The ORGDP operating costs will vary with the type of material being processed and with the handling effort required. However, if the scrap can be handled conveniently and does not require washing prior to processing, the ORGDP operating costs have been estimated not to exceed 6-1/2 cents per pound.

In order that an evaluation can be made on processing compressor blades from the three gaseous diffusion sites, we would appreciate receiving the following information:

Paducah and Portsmouth

1. An estimate of the quantity of scrap blades on hand.

2. Transportation cost to Oak Ridge.

3. Present processing cost and credit received for product, if any.

Paducah only

1. Expiration date of the contract with Doehler Unarvie to reprocess contaminated Al blades.

2. Credit received from Doehler Jarvis for scrap blades.

3. Quantity of scrap blades on hand in excess of quantity to be furnished to Doehler Jarvis.

In addition to scrap compressor blades, final meltings of large accumulations of scrap from the ORGDP Barrier operations have been made in the furnace. Large quantities of scrap materials containing Monel, copper, Phosphor bronze, nickel, iron, etc., have been successfully converted into saleable ingots. We would also be interested in your comments as to quantities on hand and

your plans for disposal of these type materials as the ORGDP facility will also be available to process large quantities of these materials.

Your cooperation in furnishing us the above information will be appreciated.

S. R. Sapirie

CC: Supply Division
R. C. Armstrong

UNION CARBIDE NUCLEAR COMPANY • DIVISION OF UNION CARBIDE CORPORATION

POST OFFICE BOX P, OAK RIDGE, TENNESSEE

June 25, 1962

Goodyear Atomic Corporation
Post Office Box 628
Portsmouth, Ohio

Attention: Mr. G. H. Reynolds

Gentlemen:

Aluminum Melting Facility
Oak Ridge Gaseous Diffusion Plant

In answer to a request from Mr. J. B. Mitchelson, we are transmitting development information and test data relative to the design and proposed operation of our recently installed molten salt bath aluminum melting furnace. It is our understanding that you are currently experiencing difficulty in reducing the uranium concentration in the aluminum ingots to a satisfactory level. In the development studies at the Oak Ridge Gaseous Diffusion Plant, it was found that the uranium was concentrated at the aluminum-salt interface and in the dross at the surface of the molten metal. Our furnace was designed, therefore, to remove most of the uranium in the first or melting compartment. This is accomplished by maintaining a very thin level of aluminum in this area and charging the contaminated metal directly into the molten salt. The uranium concentration is further reduced in the second or tapping section by withdrawing the molten aluminum at a point intermediate between the aluminum-salt interface and the surface. Consequently, the uranium concentration in the large holding furnace is expected to meet salable limits.

Should your studies indicate that the modifications required to your furnace to attain these standards will involve an excessive cost, we would like to suggest that you give consideration to sending your scrap to the Oak Ridge Gaseous Diffusion Plant for subsequent processing as our unit will have adequate capacity. Preoperational testing indicated a structural defect in the melting and tapping sections of our Upton furnace; therefore, these facilities will not be available for approximately two months. However, at this time, it is estimated that the processing costs, excluding approximately $0.01 per pound for transportation to Oak Ridge, is expected to be less than $0.10 per pound of product aluminum for small scrap such as blades and wire. Large uncontaminated material, such as size 000 converter transitions compacted for charging in the 24-inch wide by 14-foot long furnace opening, can be processed at a slightly lower cost.

If we can provide any further assistance relative to this matter, please advise.

Very truly yours,

UNION CARBIDE NUCLEAR COMPANY

A. P. Huber, Plant Superintendent
Oak Ridge Gaseous Diffusion Plant

APH:RDS:lb

Attachments

cc: Mr. D. M. Lang
Mr. J. P. Murray
Mr. R. L. Newton
Mr. M. F. Schwenn
File

cc YPMR.

INTERDEPARTMENTAL CORRESPONDENCE

GOODYEAR ATOMIC CORPORATION

~~CONFIDENTIAL RD~~ UNCLASSIFIED

(2)

TO: G. H. Reynolds
General Manager

DEPT:

LOCATION: X-100

DATE: Sept. 14, 1961

FROM DEPT:

CODE NO: GAT-801-61-17

REFERENCE: Redacted

~~CLASSIFIED~~

SUBJECT: [redacted]

~~CLASSIFIED~~

Redacted by:
WTB Brown 3/31/00
RE Jackson 3/31/00

On November 10, 1959, a survey was made to determine the type and categories of scrap aluminum accumulated from our various programs and the approximate weight of each. [redacted]

Following this survey, a justification was prepared for an aluminum smelter which was installed and placed in operation during 1961. The first category of aluminum chosen to smelt and pour into ingots was the wrought - which net approximately 271 tons.

During the past several years our metallurgists were requested by the Chemical Operations Sub-division, at various times, to [redacted]

Through the last few weeks of August and early September, Chemical Operations met with the metallurgists to discuss their recommendations and specifications for smelting the scrap castings and wire. It so happened that the specification for processing the wire was ready first and the procedure was released on Sept. 6, 1961. In order to issue this specification, it was necessary for Metallurgy to review all of their earlier work which was the result of considerable advanced planning on the part of Chemical Operations and Technical Division personnel.

Preliminary discussions were held between Chemical Operations and Security personnel to plan proper handling methods and related problems associated with processing this material. A subsequent meeting was held on September 6 and detailed plans were developed in preparation for a trial run which was started Sept. 7, 1961.

Starting Thursday, September 7, after careful planning, preparation and coordination with all departments concerned, the smelter [redacted]

UNCLASSIFIED/NOT UCNI
Charles Crabtree ADC 4148
Review Date: 5/3 /2000

APPROVED FOR RELEASE
W.T. Brown/DOE 3/31/00

RESTRICTED DATA
This document contains Restricted Data as defined in the Atomic Energy Act of 1954, as amended. Its transmittal or disclosure of its contents in any manner to an unauthorized person is prohibited. Administrative and Technical Corrections.

UNCLASSIFIED

~~CONFIDENTIAL RD~~

CLASSIFICATION CANCELLED OR CHANGED TO ~~CONFIDENTIAL RD~~
AUTHORITY Doc 2993
BY [redacted] DATE 5/5/00

G. H. Reynolds -2- Sept. 14, 1961

Subj: [redacted] GAT-801-61-17

The attached chronological report as prepared by J. B. Mitchelson, Supt. of Chemical Operations Sub-division, outlines the various steps followed while performing the work accomplished to date.

Since the scrap aluminum and the smelter are located at X-744-G, it was planned to [redacted], run it through the smelter, and return the ingots to the location vacated by the scrap.

During numerous visitations, we have been requested to show our [redacted] personnel in the program and the question has been raised frequently - "Can't something be done to get rid of this scrap in a proper manner?". Therefore, "no little effort" has been directed to meet these requests.

If the planning and methods developed for this project meet with the approval of all concerned, we should like permission to proceed. However, if other recommendations are in order we would appreciate having such information at the earliest possible date in order that the material which is now in the smelter may be reduced to ingots and returned to the building.

R M Rutherford

R. M. Rutherford
Manager
Production Division

RMR:agb
GAT
Encl. (1)

cc: C.R. Milone
J.B. Mitchelson
R.B. Boeye

[redacted]

[redacted]

believed - when we got an aluminum smelter - that this rather messy storage could be improved by processing material through the smelter.

During the past, Chemical Operations and Metallurgy Department had been working together to develop a suitable method for handling and processing this material. Being aware of the security problem involved, every effort was made to develop a process which would result in a declassified product.

1. It became apparent during the week of August 28, 1961, that the wrought aluminum - including a load of miscellaneous scrap aluminum - would be completely processed during the Labor Day weekend.

2. On August 31 and September 1, it was indicated in the morning meetings that when the wrought aluminum program was completed during the coming weekend, the smelter would be placed on intermediate heat (800-1000°F) until after Labor Day, at which time [redacted]

3. On September 5 (p.m.) at a meeting held in the X-710 Building and attended by R. B. Stambaugh, V. S. Emler, M. L. Geneva, R. A. Holthaus and J. B. Mitchelson, a discussion was held on [redacted]

   either that afternoon or the next morning. The metallurgists wanted to review their previous work on this subject before issuing a procedure. The Metallurgy Department then issued a procedure on the afternoon of September 6.

4. On September 6, 1961, 3 p.m., a meeting was held by R. A. Holthaus, R. B. Boeye, R. H. Seaman and J. B. Mitchelson, to discuss [redacted] At the close of this meeting a procedure for security was established. The program was to start at 8 a.m., September 7.

[redacted]

5. On September 7 at 8 a.m., in the presence of Chemical Operations supervision and a security officer, the area from the smelter to the secured area door was thoroughly cleaned. [redacted]

6. [redacted] added to the smelter by 3 p.m. on September 7, 1961. Charging was stopped and drossing was started. Five 55-gallon drums of dross were removed. These drums had been painted with green paint, indicating security material. These drums of dross were transferred back into the security area on the day and afternoon shifts.

7. On September 8 at 8 a.m., charging operation was resumed. [redacted] to the smelter following the procedure above. After the completed batch was drossed (total - 6-1/2 drums), it was decided to hold the batch until further notice. A cover of 1/2-inch of flux was added. Temperature was maintained at 1400°F (Saturday and Sunday).

8. On September 11 at 8 a.m., the smelter was tapped (upper tapping hole). Four ingots were poured directly into the mold, followed by four ingots which were poured through 40 mesh stainless steel screen. These ingots were marked and transferred to the Metallurgy Department for analysis. (Security transfer).

9. On September 11 at 9 a.m., the smelter tapping hole was sealed and the temperature has been maintained at 1400°F.

UNITED STATES
ATOMIC ENERGY COMMISSION

IN REPLY REFER TO:
AF:GWS

Portsmouth, Ohio

AUG 1 1961

Goodyear Atomic Corporation
Portsmouth, Ohio

Attention: Mr. G. H. Reynolds, General Manager

Subject: SALE OF ALUMINUM INGOTS FROM SMELTING OPERATIONS

Gentlemen:

We have been advised by Oak Ridge that aluminum ingots produced through August 1, 1961, may be offered for public sale. They advised further that the closing date of their declaration to the General Services Administration is August 15, 1961, and that if requests for transfer of ingots have not been received by that date you may proceed with sale of all ingots produced under this program either prior or subsequent to August 15, 1961.

We trust that this information will be helpful in your programming of the sale of these aluminum ingots.

Very truly yours,

Robert H. Thalgott

Robert H. Thalgott
Manager, Portsmouth Area

cc - cxg
rmr

UNITED STATES
ATOMIC ENERGY COMMISSION

IN REPLY REFER TO:
AF:GWS

Portsmouth, Ohio

JUL 19 1961

Goodyear Atomic Corporation
Portsmouth, Ohio

Attention: Mr. G. H. Reynolds, General Manager

Subject: SALE OF ALUMINUM INGOTS FROM SMELTING OPERATIONS

Gentlemen:

We have been notified by Oak Ridge that aluminum ingots produced through July 1, 1961, may be offered for public sale. The Terms and Conditions of the Invitation to Bid should contain the specifications set forth in the memorandum attached to our letter of May 29, 1961, subject as above, as well as the standard contamination clauses.

Disposition instructions covering future production of aluminum ingots will be furnished to you as received from Oak Ridge.

Very truly yours,

Robert H. Thalgott

Robert H. Thalgott
Manager, Portsmouth Area

cc Cady
RMR
JSD
GWS

GWS 7/19/61

APPROVED FOR RELEASE
W.T. Brown / DOE 3/31/00

UNCLASSIFIED/NOT UCNI
Charles Crabtree ADC 4148
Review Date: 4/3 /2000

UNITED STATES
ATOMIC ENERGY COMMISSION

IN REPLY REFER TO:
O:WK

Portsmouth, Ohio

MAR 25 1960

Goodyear Atomic Corporation
Post Office Box 628
Portsmouth, Ohio

Attention: Mr. D. H. Francis, General Manager

Subject: ALUMINUM SMELTING FACILITY, PORTSMOUTH SITE

Gentlemen:

We are enclosing, for your information, a copy of a memorandum dated March 22, 1960, from S. R. Sapirie to G. F. Quinn, subject as above. You will note that this memorandum requests an exception to the provisions of BOB Bulletin 60-2 for the construction and operation of an aluminum smelting facility at this site.

Very truly yours,

R. H. McCulloh
Manager, Portsmouth Area

Enclosure:
As stated

GAT-2-645(5-4-14-x)
rte: JSD CLJ, WAB, DHF-file
3/24

Unclassified

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W.I. Brown / DOE 3/31/00

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Charles Crabtree ADC 4148
Review Date: 4/3 /2000